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Standard Specification for Mineral Fiber Thermal Insulating Cement¹

This standard is issued under the fixed designation C 195; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers mineral fiber thermal insulating materials in the form of dry cement, which, when mixed with a suitable proportion of water, applied as a plastic mass, and dried in place, affords resistance to heat transmission on surfaces operating at temperatures between 250 and 1900°F (about 121 and 1038°C).

~~1.2 The values stated in inch-pound units are to be regarded as the standard. The SI equivalents of inch-pound units are given in parentheses and may be approximate.~~

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 The following safety hazards caveat pertains only to the test methods section of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

~~C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates~~

~~C 163 Practice for Mixing Thermal Insulating Cement Samples~~

~~C 166 Test Method for Covering Capacity and Volume Change Upon Drying of Thermal Insulating Cement~~

~~C 168 Terminology Relating to Thermal Insulating Materials² Terminology Relating to Thermal Insulation~~

~~C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus²~~

~~C 353 Test Method for Adhesion of Dried Thermal Insulating or Finishing Cement²~~

~~C 354 Test Method for Compressive Strength of Thermal Insulating or Finishing Cement² Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus~~

~~C 356 Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat~~

~~C 390 Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots²~~

~~C 405 Practice for Estimating Consistency of Wet-Mixed Thermal Insulating Cement² Practice for Sampling and Acceptance of Thermal Insulation Lots~~

~~C 411 Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation~~

~~C 518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus~~

~~C 1045 Practice for Calculating Thermal Transmission Properties From Steady-State Heat Flux Measurements² Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions~~

~~C 1058 Practice for Selecting Temperatures for Evaluating and Reporting Thermal Properties of Thermal Insulation~~

~~C 1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus~~

~~E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C/750C~~

3. Terminology

3.1 *Definitions*—Terminology C 168 shall be considered as applying to the terms used in this specification.

¹ This specification is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.20 on Homogeneous Inorganic Thermal Insulations.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* Vol 04.06, volume information, refer to the standard's Document Summary page on the ASTM website.

4. Materials and Manufacture

- 4.1 Mineral fiber thermal insulating cement shall be composed of mineral fiber and inorganic fillers, with a suitable proportion of heat-resistant binder.
- 4.2 The mineral fiber shall consist of rock, slag, or glass processed from a molten state into fibrous form.
- 4.3 Asbestos shall not be used as an ingredient or component part of the product.

5. Other Requirements

5.1 The cement shall conform to the requirements given in Table 1. ~~Conformance shall be based on results of tests on specimens first mixed with water, according to the ratio for proper troweling consistency determined in accordance with Section 10.~~ Conformance shall be based on results of tests on specimens prepared in accordance with 9.1.

5.2 *Maximum Use Temperature*—When tested in accordance with ~~paragraph 10.8~~ 10.5, the dried cement shall not warp, flame, or glow during hot surface exposure. No evidence of melting or fiber degradation shall be evident upon post-test inspection.

5.3 *Non-combustibility*—~~When tested in accordance with paragraph 10.9, the dried cement specimen, using 10.6.7.1, shall not exceed the recorded temperature rise more than 54°F (30°C) with no flaming or weight loss exceeding 5%.—When tested in accordance with 10.6, the dried cement shall conform to the requirements of Test Method E 136.~~

6. Qualification Requirements

6.1 The following requirements are employed for purposes of initial material or product qualification:

- ~~6.1.1 Consistency;~~
- ~~6.1.2 Compressive strength;~~
- ~~6.1.3 Linear shrinkage;~~
- ~~6.1.4 Apparent thermal conductivity; and~~
- ~~6.1.5 Dry adhesion to steel.~~
- 6.1.1 Linear shrinkage; and
- 6.1.2 Dry adhesion to steel.

7. Sampling

7.1 The cement shall be sampled, for the purpose of tests, using one of the following procedures. Unless otherwise specified or agreed upon between the purchaser and the manufacturer or supplier, the cement shall be sampled using the manufacturer's standard procedure.

7.1.1 Use Criteria C 390. Each bag shall represent a unit.

7.1.1.1 In a single sampling plan by attributes the acceptability of a lot will be determined by the number of units of product in the sample that do not conform to the specifications. The acceptable quality level (AQL) and limiting quality level (LQL) of an acceptance sampling plan, expressed as percentages of the units nonconforming, are characteristics of the sampling plan and are not to be viewed as product specifications.

7.1.2 Use the average of the test data from the number of test specimens required by the appropriate test method to represent the average for the entire lot.

7.2 The specimen for test is to be taken from the middle of a bag, so as to be representative of material from the entire bag.

8. Number of Tests and Retests

8.1 If the average of the test data obtained using 7.1.2 fails to conform to the requirements of this specification, a second sample shall be taken from the lot. Average the results of the retest with the results of the original test to determine compliance with this specification.

TABLE 1 Physical Requirements

Dry covering capacity, min, ft ² , 1 in. in thickness per 100 lb of dry cement (m ² , 1 cm in thickness per 100 kg of dry cement)	30 (15.3)
Dry covering capacity, min, ft ² , 1 in. in thickness per 100 lb of dry cement (m ² , 1 cm in thickness per 100 kg of dry cement)	30 (15.6)
Volume change (shrinkage) upon drying, max, %	35 (35)
Compressive strength at 5% deformation, min, psi (kPa)	10 (69)
Dry adhesion to steel, min, psi (kPa)	4 (27.6)
Linear shrinkage (length) after heat soaking at 1600°F (871°C) max, %	5 (5)
Apparent thermal conductivity, max, Btu-in./h-ft ² ·°F (W/m·K): ^A	
At mean temperature of 200°F (93°C)	0.70 (0.101)
At mean temperature of 500°F (260°C)	0.85 (0.123)
At mean temperature of 700°F (371°C)	0.95 (0.137)
At mean temperature of 900°F (482°C)	1.2 (0.173)

^A The user is advised that some applications could require the knowledge of the thermal conductivity of the insulating cement at mean temperatures above those shown. Consult the manufacturer for data at mean temperatures exceeding those listed.